To: EPA Staff: George Faison, Sasha Gerhard, David Cozzie and Charlene Spells
From: Pier Cello – Managing Director, Entsorga;
Paolo Corollo – Executive Vice President, Chemtex;
Jonathan Birdsong – Principal, BlueWater Strategies.
Date: August 2, 2013
Subject: Written answers to questions posed by EPA re: Entsorga comfort letter.

George, Sasha, David and Charlene –

Thank you very much for taking the time to talk to us this week. We found it to be a very productive conversation. Below are written answers to the questions EPA submitted to us on July 29th, and others we discussed over the phone on Wednesday. In addition, we are including the report you requested as well as pictures of one of our completed commercial facilities.

Prior to providing written answers to your written questions, we wanted to address the issues related to the amount of SRF to be used at the Essroc facility in Martinsburg, WV. After confirming with Essroc, while it is anticipated that the yearly substitution of fossil fuel in the Martinsburg facility won't exceed 30%,and that during co-firing (fossil fuel + SRF) the SRF won't exceed 40%, the capacity of the proposed Entsorga facility will allow producing a quantity of SRF (approximately 35,000 tons per year) that will be not higher than 15% of the coal yearly feed rate of the facility. Also we can confirm that in most European countries the percentage of displacement of fossil fuels by SRF averages 30% to 40%, very much in line with the target of the Essroc facility for the long term.

If you have any further questions on this issue, please don't hesitate to contact us at your convenience.

Entsorga – Requests for clarification/additional information from the EPA: (based on HEBIOT MBT Technology Review)

1) *Are the intermediate feed streams (over screen, under screen etc) quality assured in the same way as the final product to ensure consistency across the batch and from batch to batch?*

    a) Yes –The quality of the intermediate stream is monitored regularly. When the incoming waste stream changes or when quality control on the output shows deviation from expected values, we are able to adjust our operation to ensure that the quality of the product continues to meet all required specifications.

2) *Can you explain how the under screen materials are homogenized?*

    a) The mechanical action of the drum screener, together with the dimensional sorting, mixes the material and creates the required porosity for aerobic

fermentation. The under screen is where most of the biogenic fractions and water content concentrate and homogenizes the product.

3) *Is the water content of the materials exiting the bio-oxidation hall tested or monitored before moving on to the refining stage? If so, what is the range of values typically seen? How frequent is the testing/monitoring? Are data logs maintained? [From the documentation there appears to be a wide range 15-30%.]* [1]

a) Yes – We regularly monitor the bio-oxidation hall and data logs are stored and properly maintained in the plant's database.

Additionally, we have put in place mechanisms to perform test campaigns if the process seems to deviate from the required performance and we need to adjust the plant.

A testing campaign would be carried out in the following cases:

- When the quality of the incoming waste changes;
- When the process parameters monitored from the supervision system shows a deviation from the expected values, or;
- When quality tests on SRF shows parameters deviating from the expected values.

The expected value after bio-oxidation depends from the initial moisture content and the residence time. The typical moisture content after bio-oxidation is 23-25% and the typical moisture content of SRF is about 19%. During mechanical refining, it is possible to sort out the fines where residual moisture is concentrated.

Longer resident time can lead to lower water content. The limit for the biological section only is 19-20 %. Below these levels, the microbial activity slows down due to lack of humidity and the tradeoff between residence time and the incremental benefit is marginal.

The range of value specified in our application (15% to 30%) is the range of the water content specification that we can meet and deliver on a controlled

[1] We do note that on page 7/40 (December 7, 2012 submission), in section 3.4.1, you indicated that the feedstock is dried to a homogeneous 15% water content and indicate on next page that when the moisture falls below 15% all biological activity ceases and the material is fully stabilized. Also, on p. 9/40, you state that the moisture content is continuously controlled my means of moisture evaluation software that gives an indication of the drying level of the waste and maximizes decay. Lastly, on p.12/40 you indicate that monitoring of the waste drying level is accomplished via application of a software algorithm based on measurement of humidity, temperature and flow rate from the extracted air. (This is done for each batch of waste.)

basis when requested by the customer, it is not intended to represent an index of variability from batch to batch.

4) *Does the biological treatment process transform the materials beyond moisture and volume reduction?*

   a) A certain amount of biomass (approximately 2%) is consumed in the aerobic fermentation, degraded and released as CO_2 in air. The CO_2 emitted from biomass degradation is neutral in respect to Green House effect.

5) *You indicate that you use a Near Infra Red (NIR) system to remove PVC plastics from the feed stream. What is the typical PVC content of your solid recovered fuel? How consistent is the chlorine content from batch to batch?*

   a) First we want to highlight that the samples considered were obtained from plants not equipped with NIR. This because PVC has been banned for the production of plastic bags in Europe and therefore the value of PVC is much lower and limited to heavy plastics from piping and other construction material that can be easily separated by more traditional sorting equipment.

      The typical sorting efficiency of NIR guaranteed by manufacturer is 95% although higher efficiencies can be achieved in normal operation. As mentioned during our conversation, there are now several equipment vendors that can provide commercially proven technology. And more specifically one in the United States, and other 3 vendors in Europe.

      The average chlorine content shown in the analysis from the samples considered is 3,338 ppm with a standard deviation of 2,232 and it is representative and consistent of the actual values and variation of SRF in Europe (without NIR quality control system).

6) *To confirm, what types of commercial and industrial waste will be used? Manufacturing seconds, scraps etc?*[2]

   a) The most likely flows of C&I waste are the following:

      - Cardboard and packaging from surrounding malls and logistic operations, and;
      - Manufacturing seconds and scraps of rubber and plastic (excluding PVC and chlorinated plastics).

[2] You earlier responded that in order to accelerate the decision process, you are limiting the request to residential waste, and if you decide they would like to use C&I waste in the future, you will conduct an assessment of that waste.

As discussed during our call the use of C&I in the facility is not at this point a top priority (as our waste partner has ready access to other avenues of disposal), in this sense we are willing to postpone considering the use of C&I to a future stage, where with the facility operating we will be able to run pilot batches and characterize them along the lines of the analysis provided with our application.

7) *Is the addition of commercial and industrial waste a consistent step or only when needed to meet customer specifications?*

   a) We do not need to add volumes of Commercial and industrial waste to meet our customer's specifications, however if we will be allowed to use C&I waste we anticipate that in order to assure consistent, quality, for us it would be of preference to base the supply of commercial and industrial waste on long term contracts rather than on a spot basis.

8) *Do you have any emissions data for the combustion of your product for particulates, sulfur dioxide, mercury or dioxin/furans?*

   a) In respect to the use of SRF in cement kiln, yes. The attached study compares the use of coal only and coal plus SRF. The study highlights that the emission have improved
   b) There are also available and published results from tests done by several other European cement manufacturers with SRF used at different concentration all pretty much confirming an improvement in the emission profiles
   c) We stress the fact that the cement kiln operates at 2200-2500°F thus making it possible to completely oxidize the dioxins.

9) *Mercury levels at the Slovenia plant were significantly higher than the OAPQS values. Can you explain why?*

   a) The values of mercury in the Slovenian SRF are consistent with mercury levels in SRF from MSW in Europe. They are lower of one order of magnitude (10^{-1}) than the OAPQS upper end of range.

      Additionally, Essroc plans to utilize a system to abate mercury in the kiln by injecting carbon activated with addiction of bromine. Their existing studies show promising results.